SESSION V

RESPONDING TO A SUSPECTED OR CONFIRMED MENINGOCOCCAL DISEASE EPIDEMIC

OBJECTIVES: At the end of this lesson, participants will be able describe how to respond to a suspected or confirmed epidemic of meningococcal disease.

METHODS: Lecture, discussion, small group exercise.

MATERIALS: Prepared overhead projector transparencies, flipchart and pens, calculators, if available.

PREPARATION:

____ Practice lectures and put transparencies in order.

____ Review the information on clinical presentation and management of meningococcal disease in Chapter 2 and Section 4.5 of the *Guidelines*.

____ Provide answers for Learning Activity 4. Calculate the dosage of *locally available* antibiotics that might be used during an epidemic and fill in possible response in the blanks row for each patient described.

____ Review the national experience in meningococcal disease control, and make notes to prepare for the discussion in Learning Activity 5.

LEARNING ACTIVITIES 2.5 hours

1. Introduction

Explain the topic and the objectives. Explain that the information given in this lesson is also found in Chapter 4 of the *Guidelines on the Detection and Control of Meningococcal Disease.*

2. Lecture: Response to an Epidemic of Meningococcal Disease

Give a presentation on responding to an epidemic, using the prepared overhead projector transparencies. There are reduced versions of the transparencies on the following pages, with space for you to write any additional notes.

Answer any questions.

Response to an Epidemic of Meningococcal Disease

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Response Steps

1. **Convene epidemic committee**
2. **Inform the public**
3. **Vaccinate the population at risk**
4. **Treat patients**
5. **Collect and report data / document epidemic**
6. **Evaluate response - Plan for improvements**

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Responsibilities
- Central Level -

- Notify World Health Organization of epidemics
- Convene National Epidemic Committee
- Plan and formulate policy
- Collect and analyze data - provide feedback to lower levels

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Roles and Responsibilities
- Central Level -

- Provide advice and assistance
- Acquire vaccine and antibiotics
- Conduct epidemiological studies
- Provide for funding

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Responsibilities
- District Level -

- **Convene epidemic committee**
- **Inform the public**
- **Treat patients**
  - support health facilities
  - train health workers
  - arrange for Temporary Treatment Centers
  - inventory / order supplies

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Responsibilities
- District Level -

- **Rapid Mass Vaccination**
  - Define target population
  - Calculate # doses needed
  - Request vaccine and supplies
  - Conduct vaccination

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Responsibilities
- District Level -

- **Monitor epidemic & control measures**
  - **Monitor:**
    - **# of cases & deaths**
    - **CFR and attack rates**
    - **geographic location**
  - **Monitor inventory of supplies**
  - **Determine need for assistance**
  - **Monitor progress of vaccination**

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Responsibilities
- Health Facility Level -

- Report cases weekly
- Collect information on patients
- Report daily during epidemics
- Treat patients
- Inventory treatment supplies
- Public education

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Epidemic Committee

- Committees are needed at district, provincial and national levels
- Coordinates epidemic preparedness
- Coordinates response to epidemic
- Needs decision making powers
- Convene committee when epidemic is suspected

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Duties of Epidemic Committee - 1

- Plan preparedness and control strategies
- Identify laboratory support
- Identify financing and resources for preparedness and control activities
- Establish procedures to access funds

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Duties of Epidemic Committee - 2

- Assign specific responsibilities for epidemic detection and response
- Establish procedures for mobilizing vaccination campaigns rapidly
- Identify resources needed for rapid epidemic response
- Estimate / stockpile supplies needed

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Duties of Epidemic Committee - 3

- Coordinate and monitor implementation of control measures
- Coordinate education of health care community and the public
- Evaluate impact of control measures, adjust strategy, review performance
- Report on the epidemic

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Members of District Epidemic Committee

- Head of district health structure
- Members of the investigation team
- Key district decision makers
- Political authorities
- Representative(s) from reference hospitals for treatment of meningococcal disease

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Reporting During an Epidemic

Health Facility Level

- Report to the district level
- Report number of cases and deaths
- Consider daily reporting during an epidemic
- Send a report even if there were no cases

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District Level

Reporting During an Epidemic

- **Report to national and provincial levels**
- **Include:**
  - The time period for the report
  - The number of health facilities reporting
    - include those that reported no cases
  - Total number of health facilities in the district
  - Total number of cases and deaths
  - # of vaccinations given and planned

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Zero Reporting

- "Zero reporting" = send a report even if no cases or deaths occurred
- Distinguishes between areas
  - that really had no cases
  - that did not send a report
  - from which the report did not arrive
- Helps evaluate effectiveness of vaccination campaign

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Plan Vaccination Strategy

- Ideal = vaccinate entire population
- If resources are limited = focus on areas and age groups at highest risk
- Use age-specific attack rates to determine *age groups* at highest risk
- Extend vaccination to all surrounding areas which have weekly attack rates over
  5 cases / 100,000

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Meningitis Vaccine

- Bivalent vaccine for serogroups A and C used in Africa
- Safe and 90% effective after one dose
- Only short term protection for children under 4 years of age
- 3-5 year protection for persons older than 4 years

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Calculate Number of Vaccine Doses Needed

Step 1: Determine population most at risk
(using age-specific attack rates)

Step 2: Multiply number at risk by 1.17
(wastage factor)

Step 3: Multiply result by 1.25
(number of reserve doses is 25%)

Result = number of doses to order
Order the same number of syringes and needles

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Calculate Vaccine Doses Needed

Example

- Population of Rolan District is 49,633 (round to 50,000)
- District will vaccinate 80% of population
  - *50,000 X .8 = 40,000*
- Multiply result by 1.17 (wastage factor)
  - *40,000 X 1.17 = 46,800*
- Multiply result by 1.25 (reserve factor)
  - *46,800 X 1.25 = 58,500*

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Vaccination Team

- 1 supervisor
- 2 vaccinators
- 2 persons to load syringes
- 2 clerks
- 1 cold chain technician
- 1 driver
- community representatives / translators

– recruit additional staff
  e.g. nursing students and volunteers

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Vaccine Site

- **Waiting Area**
  - shaded, if possible
  - give health education
- **Vaccine Card Station(s)**
- **Vaccine Administration Station(s)**
  - position syringe-loading table nearby
- **Maintain one-way flow of vaccines**
  - one entrance and one exit only

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Record Vaccinations

- Record dose and date on a vaccine card
- Use EPI, Tetanus Toxoid or special meningococcal disease card
- Mark card after the vaccine has been given
- Tally doses given, by age group
- Report numbers and ages vaccinated daily

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Informing the Public

Everyone Should Know

- the symptoms of meningococcal disease
- where to go for treatment
- *where* to go for vaccination
- *when* to go for vaccination

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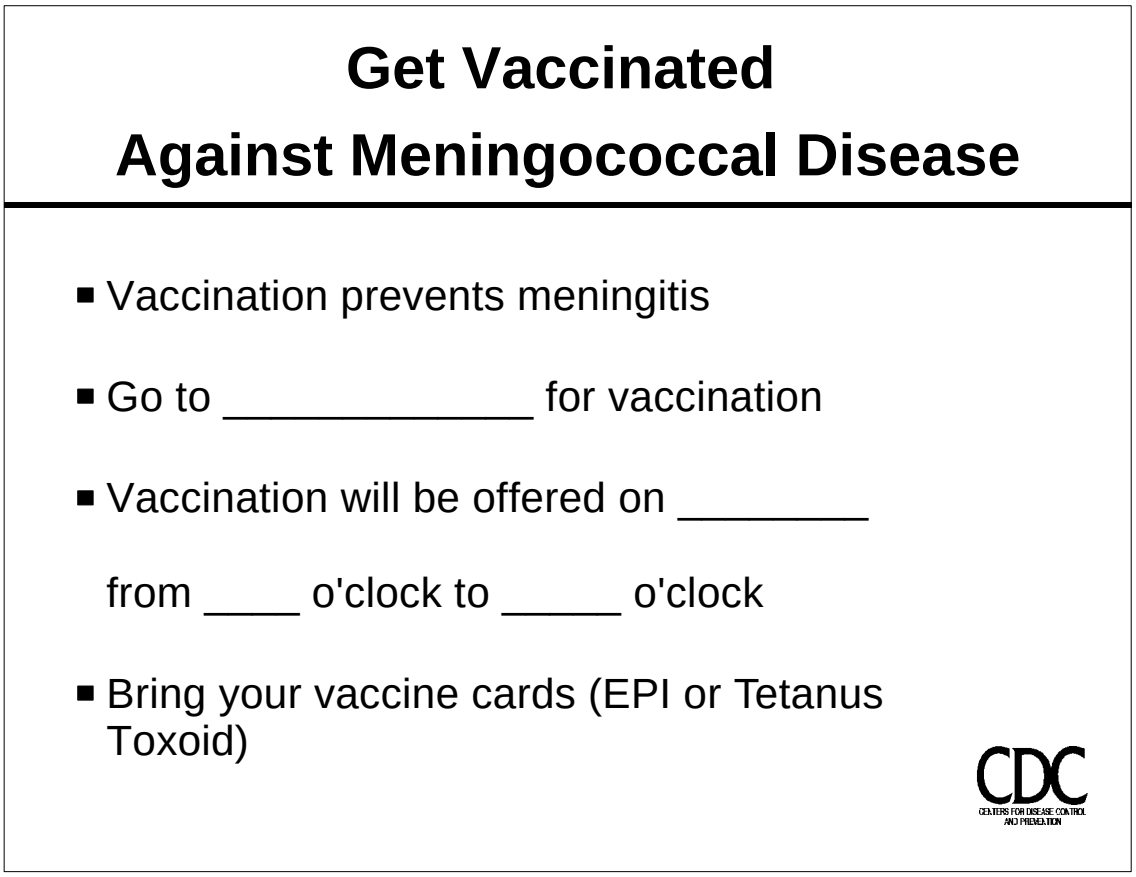
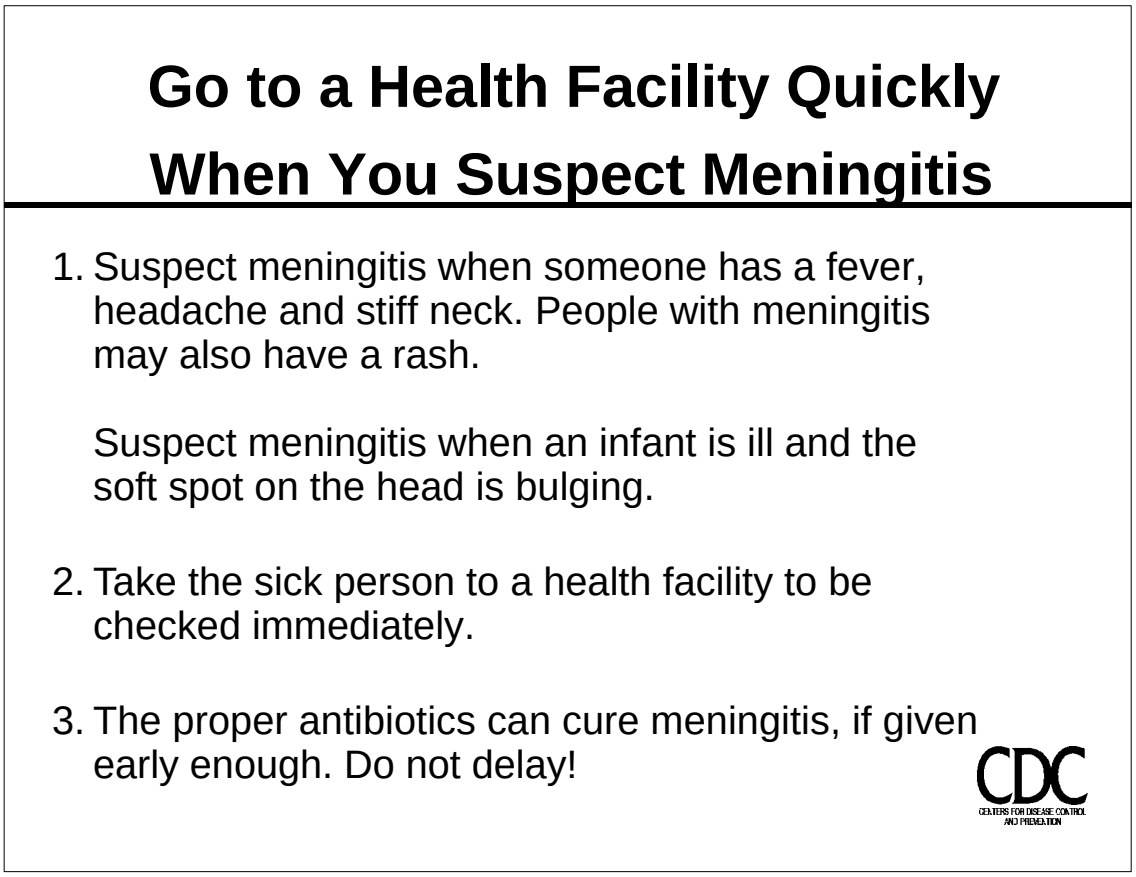


- This is an example of a public education message about vaccination.
- It tells people why they should get vaccinated, and the place and time to go for vaccination.
- Adapt this model. Fill in the blanks with the place and time of vaccinations in your area.
- Translate the message into local languages. Think of the best way to get the message to people in the area.



- This is an example of health education messages urging people to get treatment quickly if they suspect meningitis.
- (read the messages)
- Information about the location of health facilities or temporary treatment centers could be added to these messages.

Response Steps

Summary

1. Convene epidemic committee
2. Inform the public
3. Vaccinate the population at risk
4. Treat patients
5. Collect and report data / document epidemic
6. Evaluate response - Plan for improvements

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3. Lecture: Clinical Management of Meningococcal Disease

Give a lecture on the clinical presentation and management of meningococcal disease.

During the lecture, focus on the antibiotics that would be commonly available to health workers in your area. Cover the information on Tifomycin[2], even if it is not usually available. It is likely that it would be used in a large epidemic.

There is a reduced version of the transparencies on the following pages. Use the space provided to write any additional information you want to add to the lecture.

[2] Use of tradenames and commercial sources does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.

Clinical Management of Meningococcal Disease

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Carriage and Transmission

- Only humans carry *N. meningitidis*
- Bacteria live in mucosa of nose and throat
- Spread in oral secretions & respiratory droplets
- Most persons who carry *N. meningitidis* have no symptoms of disease

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Clinical Disease

	Meningitis	Septicemia
Signs and Symptoms	- fever - headache - stiff neck	- fever - rash - low BP - seizures, coma
CSF	cloudy	cloudy or clear
Response to Antibiotics	good	poor

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Meningococcal Meningitis

- 80-90% of patients in an epidemic of meningococcal disease have *meningitis*
- Fever, headache, stiff neck
  - bulging fontanelle in infants
- Cloudy CSF
- Good response to antibiotics
  - 10% of treated patients die

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Meningococcal Septicemia

- 10-20% of patients in an epidemic meningococcal disease have *septicemia*
- More serious, progresses rapidly
- Fever, petechial or purpural rash
- Cloudy or clear CSF
- Poor response to antibiotics
  - 30% of treated patients may die

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Principles of Case Management

- Admission to a health facility needed for diagnosis and for treatment
- Meningococcal disease can be fatal - Start antibiotics immediately
- Patient isolation is not necessary
- Good supportive care is important
- Simplify case management

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Choice of Antibiotics

During an Epidemic

- **Tifomycin is best in epidemics**
  - IM long acting oily chloramphenicol
  - Single dose usually effective

- ***Other antibiotics (at least a 4-day course)***
  - penicillin, ampicillin, amoxicillin
  - chloramphenicol
  - cotrimoxazole
  - sulfadiazine
  - ceftriaxone *(expensive, but only 1 dose / day)*
  - cefotaxime *(expensive)*

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Route of Administration

- **Intramuscular Tifomycin is very effective**
  - as effective as IV ampicillin
- **If parenteral administration impossible, give**
  - oral amoxicillin or
  - oral cotrimoxazole
- **When choosing antibiotics, consider ease of administration and amount of staff needed**
  - e.g. compare
    "single IM injection of Tifomycin" *vs.*
    "IV penicillin q. 4-6 hours for 4-5 days"

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Tifomycin

(100 mg / kg in a single dose)

Age	Dose in grams	Dose in ml
15 years and over	3.0 g	12 ml
10-14 years	2.5 g	10 ml
6-9 years	2.0 g	8 ml
3-5 years	1.5 g	6 ml
1-2 years	1.0 g	4 ml
2-11 mo.	0.5 g	2 ml
1-8 weeks	0.25 g	1 ml

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- Injectable oily chloramphenicol (Tifomycin) should be given at a dose of 100 mg / kg. The maximum dose is 3 grams.
- This table gives the doses according to the age of the patient.
- A single dose is usually sufficient. A second dose may be given 24-48 hours after the first if the patient has not improved.

Antibiotics for Treatment of Meningococcal Disease and Other Major Causes of Bacterial Meningitis - 1

Agent	Route	Adult Dose	Children's Dose	Duration (days)
Penicillin G	IV	3-4 MU q. 4-6 h	400,000 U/kg q. 4-6 h	≥4
Ampicillin or Amoxicillin	IV	2-3 g q. 6 h	250 mg/kg q. 6 h	≥4
Amoxicillin	oral	2-3 g q. 6 h	250 mg/kg q. 6 h.	≥4
Chloramphenicol	IV	1 g q. 8-12 h	100 mg/kg q. 8-12 h	≥4

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Antibiotics for Treatment of Meningococcal Disease and Other Major Causes of Bacterial Meningitis - 2

Agent	Route	Adult Dose	Children's Dose	Duration (days)
Cefotaxime	IV	2 g q. 6 h	250 mg/kg q. 6 h	≥4
Ceftriaxone	IM	1-2 g	50-80 mg/kg	single dose
Ceftriaxone	IV	1-2 g q. 12-24 h	50-80 mg/kg	≥4

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Antibiotics for Treatment of Meningococcal Disease and Other Major Causes of Bacterial Meningitis - 3

Agent	Route	Adult Dose	Children's Dose	Duration (days)
Cotrimoxazole	IV / IM	2 g SMZ q. 12 h	100 mg SMZ/kg q. 12 h	≥4
Cotrimoxazole	oral	2 g SMZ q. 12 h	100 mg SMZ/kg q. 12 h	≥4
Sulfadiazine	IV	1 g q. 4 h	200 mg/kg q. 4 h	≥4

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Supportive Therapy

- Paracetamol for fever
- Correct dehydration
  - IV, via NG or orally, depending on degree of dehydration and mental state of patient
- Anticonvulsants & antiemetics, if needed
- Feed patients
- Prevent bedsores

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Record Patient Information

- name
- age
- sex
- address
- date
- diagnosis
  - basis for Dx = clinical? CSF? other lab?
- specimens obtained / CSF appearance
- treatment
- outcome (lived, died, referred)

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Principles of Case Management

Summary

- Admission to a health facility needed
- Start antibiotics immediately
  - Tifomycin is best choice in a large epidemic
- Patient isolation is not necessary
- Good supportive care is important
- Simplify case management

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4. Written Exercise: Clinical Mana gement of Meningococcal Disease

a) Ask participants to turn to the Antibiotic Table in Annex 4 of the *Guidelines*, and to open their *Exercise Book* to Exercise 5.

Explain the Exercise and read through the example. Then ask participants to prescribe antibiotics for the patients described in the Exercise (they should consult the Antibiotic Table in Annex 4). For each of the patients there is a blank row under the suggested antibiotics. If different antibiotics are used in the area, then ask participants to write in the name and doses of those antibiotics in the blank rows.

As participants work, circulate and help anyone who does not seem to understand.

b) When participants have finished, review the correct answers (they are below in *italics*).

EXERCISE: CLINICAL MANAGEMENT OF MENINGOCOCCAL DISEASE

EXAMPLE: 18 MONTH OLD, 10 KG

Name of Antibiotic	***Route***	***Dose***	***Frequency***	***Duration***
Tifomycin	*IM*	*1 g* *(4 ml)*	*1 dose*	*A single dose, a second dose if not improved in 24-48 hours*
Amoxicillin	*oral*	*2.5 g*	*every 6 hours*	*at least 4 days*

PATIENT A 12 MONTH OLD, 8 KG

Name of Antibiotic	*Route*	*Dose*	*Frequency*	*Duration*
Tifomycin	IM	800 mg (if by weight) 1g (4 ml) (if by age)	1 dose	1 day, a second dose if not improved in 24-28 hours
Ampicillin	IV	2.5 g	q 6 h	3-4 days

PATIENT B 22 YEAR OLD, 70 KG

Name of Antibiotic	*Route*	*Dose*	*Frequency*	*Duration*
Tifomycin	IM	3 g 12 ml	Single dose	1 day, a second dose if not improved in 24-28 hours
Penicillin G	IV	3-4 MU	q 4-6 h	at least 4 days

PATIENT C **3 ½ YEARS OLD, 14 KG**

Name of Antibiotic	*Route*	*Dose*	*Frequency*	*Duration*
Tifomycin	IM	1.5 g (6 ml) (1.4 g by weight)	1 dose	1 day, a second dose if not improved in 24-28 hours
Chloramphenicol	IV	1.4 g	q 8-12 h	at least 4 days

5. Discussion - Respon se to Meningococcal Disease Epidemics

Lead a discussion about participants' experiences in responding to an epidemic of meningococcal disease. If they have not been involved in responding to an epidemic of meningococcal disease, ask them to think of epidemics of other diseases they may have been involved with.

Allow about 2-3 minutes for each of these topics (some will take less time, and others, such as vaccination, may take longer). Do not allow more than 30-40 minutes for the entire discussion — if participants are interested in continuing discussion, arrange to meet with them in the evening, or during a break. If none of the participants has had first-hand experience with meningococcal disease, then shorten this whole discussion.

Beside each topic is a reference to where it is covered in the *Guidelines on the Detection and Control of Meningococcal Disease*. Refer to the Guidelines if there is confusion - do not take time to read about each topic, but let participants know where they can find the information.

Discussion topics:

a. Epidemic Committee (Section 4.2)

b. Reporting cases (Sections 3.3 and 4.6)

c. Mass Vaccination Campaign (Section 4.4, and Annex 3)

- √ obtaining vaccine
- √ selecting the age groups and areas to be targeted
- √ training and organizing vaccination teams
- √ conducting vaccination
- √ record keeping during the campaign

d. Reporting cases during the epidemic (Section 4.6)

e. Obtaining supplies and assigning staff (Sections 5.4 and 5.6)

f. Clinical management (Section 4.5)

Use a sheet of flipchart paper for each topic, and ask one participant to record key words from the answers on the flipchart. You may want to write the questions below on a sheet of flipchart paper and post it during the discussion.

Ask these questions to start and encourage discussion:

- √ What were the successes?
- √ What were the problems?
- √ What lessons did you learn?
- √ Have you already acted on what you learnt?
- √ What were the obstacles that prevented an effective response?

During the discussion, make or reinforce points by referring to previous epidemics in the country. Praise the participants for past successes and their efforts. Remind them that a key to preventing cases and deaths in an epidemic is being ready to respond *before* the epidemic occurs.

6. Summary of Key Points

Ask a participant to summarize the key points, or briefly summarize them yourself.